I CLAIM:

1. A method of converting nitrogen dioxide to nitric oxide comprising passing a stream of gas comprising nitrogen dioxide over a material comprising yttrium-stabilized zirconia.

2. The method of claim 1, wherein the material comprising yttrium-stabilized zirconia comprises from 85 wt.% to 99 wt.% ZrO_2 and from 1 wt.% to 15 wt.% Y_2O_3.

3. The method of claim 1, wherein the material comprising yttrium-stabilized zirconia is platinum coated.

4. The method of claim 1, wherein the material comprising yttrium-stabilized zirconia is fusion bonded with a layer of platinum.

5. The method of claim 1, wherein the stream of gas is a stack gas stream.

6. The method of claim 1, wherein the stream of gas passes over the material comprising yttrium-stabilized zirconia at a rate of from 0.2 to 2 l/min.

7. The method of claim 1, wherein the yttrium-stabilized zirconia is cylindrical in shape.

8. The method of claim 1, wherein the yttrium-stabilized zirconia is planar in shape.

9. The method of claim 1, wherein the surface temperature of the yttrium-stabilized zirconia is from 500°C to 900°C.

10. The method of claim 1, wherein the surface temperature of the yttrium-stabilized zirconia is from 650°C to 700°C.

11. The method of claim 3, wherein the amount of oxygen in the stream of gas is determined by measuring the voltage difference across the platinum-coated material comprising yttrium-stabilized zirconia.

12. The method of claim 2, wherein the material comprising yttrium-stabilized zirconia further comprises from 0.001 to 2 wt.% of one or more other metal oxides.

13. The method of claim 12, wherein the other metal oxides comprise one or more selected from the group consisting of Al_2O_3, MgO, and CaO.

14. A device for measuring NO_x comprising:

a. a housing having a gas inlet and a gas outlet;

b. a material comprising yttrium-stabilized zirconia positioned inside of the housing;

c. a means for heating the surface of the material comprising yttrium-stabilized zirconia; and

d. a means for measuring the amount of nitric oxide in a stream of gas that has passed over the material comprising yttrium-stabilized zirconia.

15. The device of claim 14, wherein the material comprising yttrium-stabilized zirconia is platinum coated.

16. The device of claim 15, wherein the device does not include a separate means for measuring the oxygen content in the stream of gas.

17. The device of claim 16, wherein the amount of oxygen in the stream of gas is determined by measuring the voltage difference across the platinum-coated material comprising yttrium-stabilized zirconia.

18. The device of claim 14, wherein the nitrogen dioxide in a stream of gas is converted to nitric oxide inside of the housing by allowing the stream of gas to pass over the material comprising yttrium-stabilized zirconia.

19. The device of claim 14, wherein the material comprising yttrium-stabilized zirconia is heated to a surface temperature of from 500°C to 900°C.

20. The device of claim 14, wherein the material comprising yttrium-stabilized zirconia comprises from 85 wt.% to 99 wt.% ZrO_2 and from 1 wt.% to 15 wt.% Y_2O_3.

21. The device of claim 20, wherein the material comprising yttrium-stabilized zirconia further comprises from 0.001 to 2 wt.% of one or more other metal oxides.

22. The device of claim 21, wherein the other metal oxides comprise one or more selected from the group consisting of Al_2O_3, MgO, and CaO.

23. The device of claim 14, adapted to allow a stream of gas to enter the gas inlet.

24. The device of claim 23, wherein the stream of gas is a stack gas.

25. The device of claim 23, wherein the stream of gas passes over the material comprising yttrium-stabilized zirconia at a rate of from 0.2 to 2 l/min.

26. The device of claim 23, wherein the surface temperature of the yttrium-stabilized zirconia is from 650°C to 700°C.

27. The device of claim 14, wherein the means for heating the surface of the material comprising yttrium-stabilized zirconia includes an electrical resistance heater.

28. The device of claim 14, wherein the means for measuring the amount of nitric oxide in a stream of gas includes one or more methods selected from the group consisting of non-dispersive ultraviolet absorption spectroscopy, dispersive ultraviolet absorption spectroscopy, gas filter correlation ultra-violet spectroscopy, gas filter correlation

infrared spectroscopy, non-dispersive infrared absorption spectroscopy, chemiluminescent reactions between ozone and nitric oxide, and NO specific sensors.

29. The device of claim 28, wherein the NO specific sensors include electrochemical cells.

30. A method of measuring the amount of NO_x in a stream of gas comprising nitric oxides, the method comprising passing a stream of gas comprising nitric oxides through a device comprising:

a. a housing having a gas inlet adapted to accept the stream of gas and a gas outlet for expelling the stream of gas from the housing;

b. a material comprising yttrium-stabilized zirconia positioned inside of the housing;

c. a means for heating the surface of the material comprising yttrium-stabilized zirconia; and

d. a means for measuring the amount of nitric oxide in the stream of gas that has passed over the material comprising yttrium-stabilized zirconia.

31. The method of claim 30, wherein the material comprising yttrium-stabilized zirconia is platinum coated.

32. The method of claim 31, wherein the device does not include a separate means for measuring the oxygen content in the stream of gas.

33. The method of claim 31, wherein the amount of oxygen in the stream of gas is determined by measuring the voltage difference across the platinum-coated material comprising yttrium-stabilized zirconia.

34. The method of claim 30, wherein the material comprising yttrium-stabilized zirconia is heated to a surface temperature of from 500°C to 900°C.

35. The method of claim 30, wherein the material comprising yttrium-stabilized zirconia comprises from 85 wt.% to 99 wt.% ZrO_2 and from 1 wt.% to 15 wt.% Y_2O_3.

36. The method of claim 35, wherein the material comprising yttrium-stabilized zirconia further comprises from 0.001 wt.% to 2 wt.% of one or more other metal oxides.

37. The method of claim 36, wherein the other metal oxides comprise one or more selected from the group consisting of Al_2O_3, MgO, and CaO.

38. The method of claim 30, wherein the stream of gas is a stack gas.

39. The method of claim 30, wherein the stream of gas passes over the material comprising yttrium-stabilized zirconia at a rate of from 0.2 to 2 l/min.

40. The method of claim 30, wherein the surface temperature of the yttrium-stabilized zirconia is from 650°C to 700°C.

41. The method of claim 30, wherein the amount of nitric oxide in the stream of gas is determined by a method selected from the group consisting of infrared photometry, ultraviolet absorption photometry, and chemiluminescence.

42. The method of claim 30, wherein the means for heating the surface of the material comprising yttrium-stabilized zirconia in the device includes an electrical resistance heater.

43. The method of claim 30, wherein the means for measuring the amount of nitric oxide in a stream of gas in the device includes one or more methods selected from the group consisting of non-dispersive ultraviolet absorption spectroscopy, dispersive ultraviolet absorption spectroscopy, gas filter correlation ultra-violet spectroscopy, gas filter correlation infrared spectroscopy, non-dispersive infrared absorption spectroscopy, chemiluminescent reactions between ozone and nitric oxide, and NO specific sensors.

44. The method of claim 43, wherein the NO specific sensors include electrochemical cells.